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Gibson's Improvement in the Manufacture of Coal Gas.

The importance of dispensing with the dip-pipe seal in the manufacture of illuminating gas, has for a long time engaged the attention of gas engineers, but, with comparatively few exceptions, we believe, it has not been sufficiently appreciated by them; for had it been otherwise, it is reasonable to suppose that there would have been some method devised for accomplishing the purpose, which would have come into general use.

At the present time more attention is being given to the subject than at any time previous in this country, and it will doubtless lead to the general adoption of some method by which so desirable an end can be readily and safely attained. Many devices for this purpose have been brought to the notice of gas engineers by inventors in England and America, but none have as yet found sufficient favor to cause any one of them to be brought into general use. This may be attributed, perhaps, not entirely to the impracticability of the methods which have been proposed for accomplishing the object, but, in part, to the incredulity of managers of gas works as to the importance of the subject.

In a former number of this Journal we called the attention of our readers to the so-called "Gibson Improvement," patented October 5, 1869, and gave, in connection with a description of it, some account of what is claimed for it, in effecting a saving of coal, etc. It is our present purpose to show that some of the objections which have been raised against its being brought into general use are without foundation.

The plan first adopted by Mr. Gibson consisted of a hollow conical plug, placed at the lower end of the dip-pipe (which was shortened so as not to reach the coal tar in the hydraulic main), so arranged, in connection with a rod and lever, as to be readily raised and lowered to close and open the orifice. No serious objection was found to this plan, and it is still in use in connection with some benches of retorts; but any plan where the valve, or cut off, is out of sight and inaccessible, while the works are in operation, is objectionable, and is faulty, compared with one where the parts can be seen and reached at all times. The arrangement finally adopted, however, by Mr. Gibson as the best, after many trials of various plans, is that to which we have before referred. For the practicability of its application, it is necessary that the valve made use of should possess certain qualifications.

1st. It should be perfectly tight when closed, and not liable to become leaky by long continued use in the service required of it.

2nd. It should not be liable to derangement.

3rd. It should be capable of being opened and closed quickly, at all times, and the parts should not be liable to adhere, however long it may remain closed.

4th. It should not be liable to become clogged and obstructed by coal tar, or other heavy hydrocarbons, or ammoniacal salts, to which it is exposed.

5th. It should not be acted upon by sulphurous or nitrogenous compounds, with which it is more or less likely to be brought in contact.

6th. It should possess durability, corresponding to that of other parts of the gas apparatus in general use, such as the stand-pipes, bridge-pipes, etc.

It is claimed that the valve made use of, in the plan under consideration, possesses all of these requirements. It is known as the "Chapman Valve," for which letters patent of the United States were granted September 7, 1869. This valve, from the nature of its construction, is always a tight valve. The gate or plug is cylindrical in form, either circular or eliptic, and it is hollow and tapering, with guides to prevent it from turning. Its bearing, or seat, is Babbitt metal, which is cast around it, and confined firmly in the shell or body of the valve by a dove-tailed groove, into which the soft metal, when fused, is poured. This alloy expands on cooling, and becomes fixed firmly in its place. In the body of the valve there is a recess, which allows the conical plug to have further entrance in case there is any wear, or compression, of the soft metal. The plug is not only hollow, but its lower edge is beveled, so that any substance adhering to the seat will not prevent the valve from closing. It is evident that there is no grinding necessary to render it tight, and that, from the great dissimilarity of the two metals which are brought in contact, and the unctuous character of one of them, there can be no danger from adhesion, however long the valve may be allowed to remain closed.

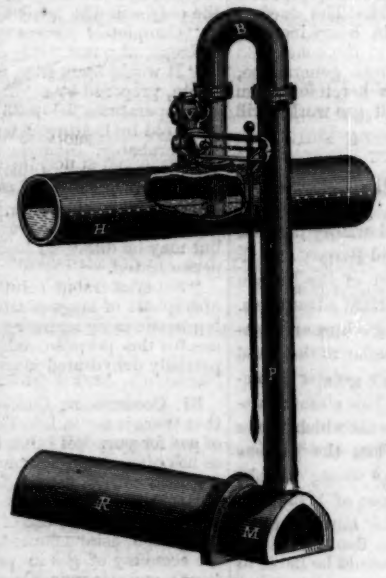


FIG. 1.

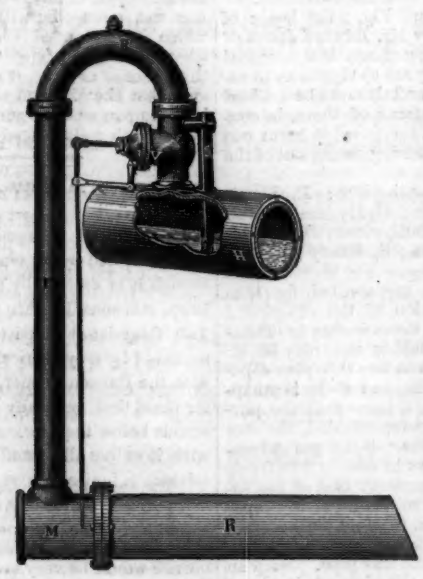


FIG. 2.

That this valve, as an adjunct to the Gibson Improvement, fulfils all the requirements above mentioned, is proved by the use to which it has been subjected in gas works for more than two years, so far as this term of trial admits; and the fact that the valves which have been longest in use show no signs of deterioration, would seem to be sufficient to remove all scepticism on the subject. In order to test this, one of the valves which had been in use in connection with a bench of retorts for nearly two years, was detached from its connection with the bridge-pipe and hydraulic main, on the 8th day of February last, and compared by us with a new valve which had never been used. The most careful scrutiny afforded no indications of wear from attrition or chemical action. During the time mentioned, though it had been constantly in use, even the stuffing box had not been repacked, and testimony given under oath, shows that nothing had been done to it to keep it in order, from the time it was put up until it was taken down for examination, excepting to wipe and oil the spindle two or three times each week.

Objection has been made to the use of any contrivance by which the dip-pipe seal is dispensed with, from a liability to loss of gas, through a defective retort in works without an exhauster. But such an objection is puerile, as any serious defect in a retort could not fail to make itself evident, and a second of time only is required to close the valve and prevent any loss of gas, except that from the charge of coal in the defective retort. The enquiry has been made as to what would, in such a case, be the consequence, in works provided with an exhauster, presuming it to be "run

below a vacuum." The answer simply is, that if such defective retort was allowed to remain in use, and if it was so defective that all the gas generated in it would pass into the flues, it would then, in connection with the gases in the flues derived from the fuel used to heat the retorts, be drawn into the hydraulic main, and mixed with the gases from the other retorts. The only possible harm which could result would be to reduce, somewhat, the illuminating power of the whole of the gas generated, by increasing the percentage of the non-luminous portion.

Objection has been made to the plan under consideration, as heretofore described, by many gas engineers, inasmuch as the opening of the valves, after charging the retorts and replacing the lids, must depend entirely upon the fidelity of the workmen employed; and as this objection has, in the minds of some, proved to be a serious obstacle in the way of its being adopted, more especially in those works where the number of retorts and of men employed is very large, two plans have been devised, the application of either of which entirely does away with this objection. One more particularly adapted for new works, or in the arrangement of new or renewal of old benches of retorts, consists of a branch pipe, in which the valve is placed, leading from the part of the dip-pipe which is outside of the main, and extending to and connecting with, but not descending into the hydraulic main. By this plan the dip-pipe is not dispensed with, and it will be evident that while the valve is open the dip-pipe will not be in use, and that the gas from the retort will have a free passage through the branch pipe, to the main, unobstructed by the hydraulic seal, and also that if, from any cause, the valve should remain closed, or become closed, after the retort was charged, the dip-pipe would operate in the same manner as it would if there was no valve in connection with it. The other consists simply in the introduction of a small pipe, to connect that portion of the body of the valve which is above the gate, with the hydraulic main; its terminus being within the main and below its liquid contents, in order to afford an outlet for the gas from the retort, should the valve be closed at any time during the "working off" of a charge from the retort. This pipe, which may be called a *safety pipe*, may be formed of the ordinary wrought iron gas tubing, and need not exceed an inch, or an inch and a quarter in diameter. It can easily be applied to benches of retorts already fitted with the Gibson Improvement.

Fig. 1 exhibits the former, and Fig. 2 the latter of these arrangements, devised by Mr. Edward Jones of the South Boston Gas-Light Company, Manager and Engineer of their works. They are so simple as to require no further explanation, and it must be evident at a glance, that by adopting either of them, in connection with the Gibson plan, no possible harm can arise from neglect of the workmen, growing out of the use of the Gibson invention.

Fig. 1.—R, Retort; M, Mouth-piece; P, Stand-pipe; B, Bridge-pipe; V, Valve; H, Hydraulic-main.

Fig. 2,—R, Retort; M, Mouth-piece; P, Stand-pipe; B, Bridge-pipe; V, Valve; S, Safety-pipe; H, Hydraulic main.

In place of the branch pipe represented, fig. 1, as forming part of the upper portion of the dip-pipe, a wrought iron pipe from two to three inches in diameter, having a valve of corresponding size, may be inserted. Such an arrangement renders this plan capable of being adapted to old works, and there is no apparent reason why it should not answer all the purpose of the larger pipe therein represented, the size being more than sufficient to allow all the gas generated from the largest sized retorts in use, to flow freely into the main. Although the present bias of gas engineers is to enlarge rather than contract the pipes connecting the retort and main, to avoid the stoppage to which small stand-pipes are liable, there is no danger of stoppage occurring beyond this pipe. Such an arrangement not only renders the plan adaptable to all works as now constructed, but considerably reduces the first cost of the alteration.

The best answer perhaps to all the objections which have been made to Mr. Gibson's plan for dispensing with dip-pipes, is the simple statement that in those works where it has been in use during periods varying from several months to more than two years, no practical difficulty has been found in its management from want of care on the part of the workmen employed, or from any other cause. The testimony of all who have had long experience in its use is in its favor, and it is only among those who have had no such experience that objections have been raised. The only one of these objections to which any importance is to be given, has been overcome by the method devised by Mr. Jones, after he had become, by his own experiments, fully impressed with the importance of doing away with the dip-pipe.

The repeated trials made with benches of retorts to which the Gibson Improvement has been applied, in connection with benches of retorts with dip-pipes, but in all other respects similar, show conclusively that a large saving is effected by it, and that the subject is not only well worthy the attention of gas engineers, but that it imperatively calls for it from all who are engaged in the management of, or are in any way interested in gas works.

The American Coal Gas-Light Improvement Company was the first to call the attention of Gas-Light Companies generally throughout the United States, to the importance to be attached to a method by which the pressure upon retorts, caused by the dip-pipes, could be avoided; and it was not till they had done so by issuing circulars and pamphlets, announcing what they had demonstrated, and had made liberal offers to aid others to verify their results, that the attention of Gas-Light Companies was awakened to the subject. Previous to their doing this, they made numerous trials of what they deemed to be the most practicable contrivance for accomplishing the object, and patiently awaited the results, which a year's experience in the manufacture of gas by this method might afford them, before committing themselves to the public.

When the only serious objection to the plan proposed and recommended by them (*serious only inasmuch as it caused many Gas Engineers to hesitate to make trial of it*) was removed by the modifications suggested by Mr. Jones. they took the necessary measures to secure them by letters patent, No. 116,450, granted to him June 27, 1871, and assigned to them, and they are now offered to all Gas-Light Companies, in connection with the Gibson Improvement, without any additional charge for their use.

Since their circulars were first issued, and the importance of the subject made manifest, by the facts set forth by them, as the result of their experience, several devices have been brought forward, for the purpose, apparently, of evading their letters patent. Without pretending to pass judgment upon the respective merits of these contrivances, or the ability of the inventors of them to sustain their claims for their originality, we cannot avoid giving to the American Coal Gas-Light Improvement Company the credit to which they are entitled, not only for their announcement of important facts, the result of their labors, and the wide spread interest they have caused to be taken in the subject, but for the successful introduction of their system into a number of gas works where the highly beneficial results derived therefrom are now being daily shown.

Prior to the undertaking of this company, there were no gas works in this country (and so far as we are informed, in any other), in which the dip-pipe seal was not connected with every retort. The success which has attended their system in every instance where it has been applied, leads us to the conclusion that, sooner or later, it *must* come into general use, and that the dip-pipe seal which has heretofore been looked upon as an essential part of all gas works, will be altogether abandoned.

A New Gas Lamp.

An improved "forge-lamp," for laboratory use, has been designed by Messrs. Delheid and Berge; and although it is essentially a modification of the Bunsen lamp, it is considered to possess important advantages. The forge-lamp consists of a "bougie burner," surmounted by a cylindrical chimney similar to that used with the Bunsen burner, but of rather greater diameter than that generally employed. This chimney descends below the gas outlet, and the air which mixes with it enters all round the jet. When the gaseous mixture is ignited above the chimney a strong draught is produced, which serves the purpose of a blowing apparatus. The air rushes in at the bottom of the chimney very energetically. But the flame from the burner would be very unsteady, and would be liable to be extinguished by a slight gust of air, were it not that this first tube is surrounded by a second of still larger diameter, so that the air for feeding the forge-lamp proper is compelled to pass through the annular space between the two tubes; thus, whilst keeping the apparatus cool, the air is warmed, which contributes to give the forge a great calorific intensity Under these conditions the gas is very perfectly burned, and the current of air which burns the gas produces the same effect as if it were forced in by blowing. Compared with the Bunsen burners, the main distinguishing features of the forge-lamp are these: The air enters below the gas outlet, and not on a level, or above it, as is usual in Bunsen burners. A larger proportion of air is admitted than in Bunsen burners, as these have their supply of air simply from larger or smaller openings in the air tube, whilst the forge burner receives air from the whole extent of the section of the tube. And there is an additional cylinder which compels the air to cool the sides of the tube, and thus prevents the annoyance of the light running in. As to the results, the forge-lamp is claimed to surpass all apparatus of the kind hitherto proposed, by the extraordinary effect produced considered in relation to the small quantity of gas consumed, and by its extreme simplicity of construction.—*Van Nostrand'.*

Chemical Repertory,

No. 58.—August 2, 1871.

EDITOR—HENRY WURTZ.

Errata.

The present editor has judged it safe that all the proofs of this Journal should be revised by himself personally. A somewhat comical illustration of the importance of this occurred in the last issue, in his brief note of experiments on precipitation of mud from saline solutions, which was unluckily handed in too shortly before going to press to admit of being read in proof. The word "electriate" was written by him *dutriate*, as scientists will have surmised. Other, less important, lapses occur in the same paragraph.

CHEMICAL EXCERPTS.

36. Supersaturated Saline Solutions.—L. C. De Coppet claims (*Chem. News*, June 9, 1871) to have made in 1868–69 a remarkable discovery as follows:

"Supersaturated solutions of sulphate of soda are usually prepared by cooling, in closed vessels, solutions saturated at a higher temperature.

"I have found that so-called supersaturated solutions of sodic sulphate may be prepared at ordinary temperatures by simply dissolving the anhydrous salt in cold water."

If the anhydrous salt has been exposed to air, it must be rendered inactive by heat (he says 104° F. is is sufficient, but prefers to heat to 212° or more). After describing details he says:

"These experiments show that an ordinary saturated solution of anhydrous sodic sulphate is identical with what is commonly called a supersaturated solution. Of course I do not mean to imply by the words 'solution of anhydrous sodic sulphate' that the salt in the solution is in the anhydrous state.

"It is now very generally admitted that crystals of the 10-atom salt (Na_2SO_4,$_{10}H_2O$) always bring about the solidification of a supersaturated solution of sodic sulphate. Among the many who of late years have investigated the subject, Mr. Tomlinson is, I believe, the only one who holds the opposite view.

"Completely effloresced Glauber's salt, though anhydrous, also invariably causes crystallization.

"It would seem from this that anhydrous sodic sulphate, prepared by drying crystals of Na_2SO_4,$_{10}H_2O$ at temperatures below 33° C. is not identical with that prepared by heating at temperatures above 33°. They are, probably, isomeric modifications. The former, whether anhydrous (effloresced) or combined with 10 atoms water, always causes the supersaturated solution to crystallize; the latter, whether anhydrous or combined with 7 atoms of water not only never does so, but may be dissolved in a solution already highly supersaturated.

"Supersaturated solutions of carbonate of soda and of sulphate of magnesia may be prepared without heating in the same manner as those of sodic sulphate. I use for the purpose anhydrous sodic carbonate and partially dehydrated magnesic sulphate."

37. Cooking by Gas.—It has often surprised us that there is not in London a much larger consumption of gas for purposes other than lighting. For cooking, as has often been demonstrated, the use of it possesses many advantages. We have before us now a report of the house governor of the London Hospital, on the results of the use of a gas-cooking apparatus in that large establishment, which conclusively proves the economy of gas in preventing a great waste of meat; and, we may add on our own account, an actual saving in cost as compared with coal. The actual saving in meat to the hospital in 125 days is said in the report to have been 4579 lbs., very nearly 10,000 lbs. on the whole year, which represents almost £300 of money. The cost of gas for roasting the meat consumed in the hospital appears to be only 1s. per day, while as regards cleanliness and saving of labor and trouble, the report states that it is difficult to exaggerate the advantages derived from the adoption of gas as the heating material. Convenient apparatus would no doubt lead to a great extension of the use of gas in kitchens, particularly in the summer months.—*Lond. Jour. of Gas-Lighting.*

38. Coal from Sea-Weed is recommended as a powerful disinfecting agent. Marquart, of Bonn, states that it is drier than charcoal, cheaper than bone coal, and possesses an extraordinary absorptive power, and is especially suited for the disinfection of houses and apartments.—*Am. Chemist.*

39. Improving Wine by Electricity.—Bouchotte has discovered that very ordinary wine may be much improved in quality by passing a current of electricity through it, using platinum electrodes. New wine,

treated by electricity, can be readily made to resemble wine a year old in flavor and quality.—*Ibid.*

40. Cements by Boettger.—The following item we owe to the *Technologist:*

Prof. Boettger prepares cements of diverse colors and great hardness by mixing various bases with soluble glass. (1) Well-sifted sulphide of antimony gives a black mass, which, after solidifying, can be polished with agate, and then possesses a fine metallic lustre; (2) fine iron-dust, which gives a gray-black cement; (3) zinc-dust—this makes a gray mass, exceedingly hard, which, on polishing, exhibits a brilliant metallic lustre of zinc, so that broken or defective zinc castings can be mended and restored by a cement that might be called a cold zinc casting; it adheres firmly to metal, stone, and wood; (4) carbonate of copper gives a bright green cement; (5) sesqui-oxide of chromium gives a dark green cement; (6) Thenard's blue, a blue cement; (7) litharge, a yellow; (8) cinnabar, a bright red; (9) carmine, a violet red. The soluble glass with fine chalk alone gives a white cement of great beauty and hardness. Sulphide of antimony and iron-dust, in equal proportions, stirred in with soluble glass, afford an exceedingly firm, black cement; zinc-dust and iron, in equal proportions, yield a hard, dark gray cement. As soluble glass can be kept on hand in liquid form, and the chalk and coloring matters are permanent and cheap, the colored elements can be readily prepared when wanted, and the material can be kept in stock, ready for use, at little expense,—*London Artizan.*

41. Note on Limestone Containing Petroleum in Nova Scotia; by D. Honeyman, (Edit. Corr., dated Halifax, Nova Scotia, Provincial Museum, March 28, 1871).—We have recently received a quantity of Lower Carboniferous limestone from Kempt in this province, having numerous cells with small crystals of calcareous spar and petroleum. When the limestone is broken, you almost invariably find the cells with the petroleum, the latter having a honey-like appearance. The limestone is in connection with gypsum.—*Amer. Jour. Science.*

42. The Louisiana Sulphur.—The second artesian well sunk with a view of determining the thickness of the sulphur beds of Louisiana and the nature of the superincumbent strata, has reached a depth of 552 feet. At a depth of 428 feet it struck the sulphur-bearing stratum. This was 112 feet in thickness, made up of layers of pure crystalline sulphur, alternating with white limestone mixed with sulphur. These were surmounted by forty-one feet of white crystalline limestone, and underlaid by twelve feet of limestone containing some white sulphur. Prof. Hilgard advances the opinion that these deposits had their origin in reactions between gypsum and lignite, the former being in excess.—*Am. Exch. and Review.*

British Association of Gas Managers—Dublin Meeting, 1871.

The first paper read (which we here condense) was by Mr. W. J. Warner—

ON THE BEST FORM OF CONDENSER.

"To no better subject could the committee have drawn the attention of this association than to 'the best form of condenser.' To no subject has so little apparent thought been given, and of no part of the manufacture of gas is so little heed paid as that of condensation. The manufacture of a subtle, complex, elastic fluid, materially affected by temperature, is carried on in many works without even the means of ascertaining what the temperature of the gas may be, and without any arrangement for controlling or regulating the same. Can there, then, be the least surprise that such varying results are obtained in both quantity and quality even in the same works, with the same description of coal at different periods.

"Upon what principle ought the refrigeration of gas to be carried on? Should it be by direct atmospheric influence, or by the intervention of another fluid? Though Mr. Lewis Thompson says little, it is believed, about the condenser, yet in a paper on Wright's 'Ventilating Condenser," published in 1852, in the *London Journal of Gas-Lighting*, it is said, his "original and elaborate investigations have proved that while the hydrocarbon vapors contained in Newcastle coal gas at 60° have a specific gravity of 3.2, those of Boghead cannel gas are only 1.21, and in Wigan cannel gas 1.77, and that the former begin to be precipitated at a higher temperature than the two last. The safe condensing minimum must, consequently, *be regulated* by the nature of the material employed in the manufacture of the gas; therefore '*a perfect condenser must,*' it is added, '*allow of its cooling power being varied* according *to the temperature of the external air, and the quantity of gas passing through it.*'

"How has this principle been carried out, so plainly laid down 20 years ago? Malam had previously adopted the arrangement of the submerged condenser, and allowing water to flow through and amongst the condensing-chambers. Mr. Livesey, has a conde ser in operation, too, I believe, upon the same principle. Another arrangement, having the same object in view, is that of water trickling over the air condenser. The same thing was proposed to be done in another, but certainly not more simple way, though patented—the application, by mechanical means, of wetted surfaces to the condensers, and so cool by evaporation. In the annular or ventilating arrangement there is but a partial regulation, which is due, not so much to the power of ventilation proper, or a strong current of air passing through, as to the power of lessening or increasing the surface action of the atmosphere. Mr. Kirkham was the first to apply this principle, and Mr. Wright's is a modification, which is identical with a refrigerator patented some years previous by a brewer—connecting-pipes being employed to conduct the gas from the top of one column to the base of the next, that the gas may always enter in this order."

Mr. Warner then gives tabular statements of three experiments made with such apparatus, and proceeds to say:

"It will be observed, though it may appear remarkably strange to some, that there is really no practical control over the temperature shown by these experiments; thus—

No. 1.	Covers on,	temp. 54½,	air 54
" 2.	Covers off,	" 49½,	" 49
" 3.	" "	" 55,	" 55

Now, for the condenser to have answered to the principles laid down, it should have been shown that the gas could be maintained at a standard temperature, with varying makes and varying atmospheric temperatures—that the gas could be kept either below, at, or above the air. This, it is obvious, however, cannot be done with an arrangement in which the air alone, directly, is the cooling power.

In the high thermometrical absorbent power of water we have the means, and in the refrigeration of it the power to maintain the gas at any given temperature; and from the quantity of water that is used for washing and scrubbing, these two separate processes—condensing and scrubbing—may well be conducted at one operation; and with a scrubber constructed upon the principle described at the last meeting of the association, no difficulty could arise from stoppages.

The first of the two new scrubbers set in action at South Shields was placed before the condensers, and though these were scarcely powerful enough in warm winter weather with the heaviest make, since the scrubber has been in action half the condensers have been thrown off, and the long connecting-pipes of the scrubber have been jacketed in, and the entire upper portion of the condensers I am now having covered in, so as to protect them from the cooling influence of frost, rain, and snow. The feed or liquor pipes I propose to arrange for refrigeration so that the temperature of the liquor may be maintained at that desired. The condensers are arranged in two sets, and may be worked either together or separate, and by means of a change-valve, which was constructed for me by the Messrs. Cockey, they may be worked from either end, and so under exhaust or pressure—that is to say, we can exhaust either through the condensers or directly from the retorts—an arrangement which we have occasionally found exceedingly useful. Upon some future occasion I may take up this subject again, and give the association what notes I may have upon it, and upon the relative positions of the condensers.

A good thermometer is much needed for condensers. That of Mr. Parkinson is a very neat arrangement, but the metal case does not stand well; the case would be better, too, if it were connected by a non-conducting plug instead of a metal one screwed into the condenser, and elastic; also if the conical metal plug of the thermometer were of a non-conducting substance.

In the discussion on this paper Mr. G. Anderson said that he found it best to begin his condensation by passing the gas through a pipe, which ran round the inside of the retort house. This pipe was supported by brackets, which extended through the walls of the retort house, and supported an external pipe along which the gas was afterwards carried. Its further condensation was then a very simple process. He was connected with two works, one which had been in operation forty years, and the other only five or six. In the former they were sometimes troubled with depositions of naphthaline; in the latter, where the arrangement just referred to was adopted, of internal and external pipes in connection with the retort house, they had never known what naphthaline was. This he regarded as a very important matter, because where there was a deposition of naphthaline, not only was there the loss arising from the removal of carbon out of the gas, but also the trouble and cost of clearing it out of the pipes.

Mr. Hodgson Jones thought the effect of carrying the pipe round the exterior of the retort house, as explained by Mr. Anderson, would be disadvantageous, as tending, rather than otherwise, to the deposition of naphthaline, unless it were in a trough of water.

Mr. Anderson (Bath) said he erected a wrought-iron pipe 18 inches in diameter, and ¼ inch thick. This pipe, which was 100 yards in length, was laid upon girders entirely round the interior of the purifying house. It was his belief that, to keep down naphthaline, the gas must not be cooled too rapidly. He had twelve pipes to his condenser, six of which were washed inside with ammoniacal liquor of 6 deg. Twaddle, and he always took care that the crude gas was not of a higher temperature than the liquor employed, because if it were so, the ammonia was extracted from the liquor by the gas. The exterior of the condenser was shielded from the sun by a tarpaulin, over which a stream of cold water flowed, because being ¾ inch thick, the pipes absorbed a great amount or heat. The gas then passed through two scrubbers, where it was washed with liquor of 6 deg. Twaddle. Afterwards it passed through the washer, care being taken to keep up a perpetual motion of cold water. He was proud to say that he had not cleaned out his gasholders for twelve months, whereas previous to adopting his present plan he had to examine them every three months.

Mr. Warner said he had adopted the plan spoken of by Mr. Anderson, of carrying the crude gas round the retort-house, and he believed most gas managers had done the same.

Mr. Church remarked that many present were aware of the improvement effected by the system referred to by Mr. Anderson, of carrying the pipes round the inside of the retort-house. There was one point in regard to condensation which has not been mentioned, and which it was desirable to keep prominently in view, viz., the importance of keeping the gas and tar in contact as long as possible. He believed it was the best mode of preventing the deposition of naphthaline, and, as far as his experience went, there was no better way to improve the quality of the gas. By carrying a pipe round the retort house, as suggested, that temperature was preserved which was most calculated to retain the tar and gas together.

Mr. D. Lane said that Mr. Lewis Thompson pointed out the necessity of avoiding over-condensation as well as under-condensation. He stated that at the ordinary temperature at which gas was consumed it carried with it a certain proportion of hydrocarbons, which would be condensable at a lower temperature. Those hydrocarbons had a specific power to hold naphthaline in mechanical suspension. If the temperature was too high more naphthaline left the condenser than the other hydrocarbons had power thus to retain. On the other hand, if it was too low the result was that the other hydrocarbons themselves were also condensed, and the naphthaline could no longer be held in suspension. Every gas engineer who had much experience was convinced of the fact that the longer the gas was kept in contact with the tar, the freer would it be from naphthaline, and the higher its illuminating power. The remark made by Mr. Warner respecting the mode of regulating temperature had not been sufficiently noted. It appeared well worthy of consideration whether some automatic arrangement could not be used which would keep the gas up to a certain temperature. With the condensers at present used the gas varied very much in temperature, according to the season of the year. There was surely some particular temperature which was best calculated to prevent the deposition of naphthaline, and retain the highest illuminating power of the gas. In none of the condensers he had seen was there any real automatic arrangement of the kind designed, and gas managers would do well to direct their minds to the subject.

Mr. Hartley (Westminster) said Mr. Warner had expressed a wish to have a non-conducting thermometer which should not take the heat from the condensers. It seemed to him that this was a matter very easily accomplished. Nothing more was necessary than to plug the column with a block of wood, and interpose a medium which would prevent the thermometer taking the heat from the metal.

Mr. Warner said he had adopted that plan, but it was always failing. He did not know whether the members had seen Mr. Parkinson's arrangement, which was an extremely neat one. First of all, there was a very thin casing of white metal soldered to the screw-plug screwed into the condenser itself. The plug which went into the condenser had a ground conical seating for another plug to fit into, so as to make an air-tight joint. To this cone there was attached a thermometer, which, when placed in its position, was, of course, excluded from external air, and conveyed the temperature of the gas through the metal casing. He had given this arrangement a long trial, and had found it very useful.

[To be continued.]

Powers of Gas-Light Companies.

An Act passed by the New York State Legislature, in April of the present year, makes an important amendment to the law of 1848, under which Gas-Light Companies are formed in this State. Under section 2 of that law such companies could purchase any rea

and personal estate, necessary to enable them to carry on the operations named in their Certificates of Incorporation, but no power was given to make such purchases and issue stock to the amount of the value of the property purchased in payment therefor.

The following are the provisions of the Act of April 1871:

Sec. 1. Section two of the Act entitled "An Act to authorize the formation of Gas-Light Companies," passed February sixteen, eighteen hundred and forty-eight, is hereby amended so as to read as follows;

Sec. 2. When the certificate shall have been filed as aforesaid, the persons who shall have signed and acknowledged the same, and their successors, shall be a body politic and corporate in fact and in name, by the name stated in such certificate, and by that name have succession, and shall be capable of sueing and being sued in any court of law or equity in this State; and they and their successors may have a common seal and may make and alter the same at pleasure; and they shall by their corporate name, be capable in law of purchasing, holding, and conveying any real and personal estate whatever, which may be necessary to enable the said company to carry on the operations named in such certificate, but shall not mortgage the same or give any lien thereon. The trustees of such company may purchase mines, manufactories, and other property necessary for their business, and issue stock to the amount of the value thereof in payment therefor; and the stock so issued shall be declared and taken to be full stock, and not liable to any further calls; neither shall the holders thereof be liable for any further payments under the provisions of the tenth section of the said act; but in all statements and reports of the company to be published, this stock shall not be stated or reported as being issued for cash paid into the company, but shall be reported in this respect according to the fact.

Sec. 3. This act shall take effect immediately.

Under this Act, Gas-Light Companies hold the same powers to issue stock for the purchase of property as is conferred on manufacturing, mining and other corporations organized under the law of February 17, 1848, and the Acts amendatory thereof.

Kindling Gas at Low Temperatures—Klinkerfues's Experiments.

In our issue of July 3, page 5, was copied from the *Scientific American* a somewhat obscure item relating to this subject. Our contemporary has since given us fuller information on these interesting new experiments of KLINKERFUES, Professor in the University of Goettingen. We condense as follows:

"The invention consists in the arrangement of a vessel containing a liquid, which, when brought in contact with a pair of galvanic plates suspended within said vessel, will close an electric circle, and produce a current, whereby a piece or pieces of platinum wire, held in electrodes that connect with the said galvanic plates, will be excited to produce catalytic action and ignite combustible matter with which they may be brought in contact.

"Klinkerfues has shown that not even a red heat is required. A platinum wire inserted between the poles of a very small galvanic pair of zinc and graphite, without showing the slightest emission of light in the dark, ignited a jet of gas almost instantaneously.

"The inventor has had several kinds of gas-lighting contrivances constructed, for which patents have been obtained through the *Scientific American* Patent Agency.

"The first apparatus consists of a thin, hollow, glass cylinder, of suitable size, closed at the bottom, and covered by a plate, bearing on the inside a galvanic pair of zinc and graphite plates of small size.

"These plates are respectively connected with electrodes that project from the outside of the plate, holding an inserted bit of platinum wire. The liquid filling consists preferably of the well known mixture of bichromate of potassa and diluted sulphuric acid, which will be active for a long time.

"In order to light gas flames for domestic purposes with this simple apparatus it is only necessary to incline it sufficiently, and, at the same time, hold the platinum wire before the jet of the gas that escapes from the burner. But when the apparatus is placed upright, the plates not touching the liquid, no galvanic action takes place, and consequently no material is consumed by electric action, so that, it is claimed, a mixture of the value of a few cents suffices for many thousand repetitions of the operation.

"Another of the proposed contrivances is intended to be applied to street gas lights for the purpose of simultaneously lighting and extinguishing a number of lamps from a single station with the smallest possible loss of gas or other material.

"It is proposed to furnish each lamp post with its own galvanic apparatus, and to make the galvanic pair touch the liquid only during the short time of lighting up.

"A hermetically closed vessel is provided with a compartment or bell, open at the bottom, so as to communicate with the main vessel, and having a galvanic pair of zinc and graphite fixed to the cover in such a manner that the solution of bichromate of potassa with sulphuric acid, contained in the lower part of the vessel, is not reached by them when the apparatus is in its usual inactive state. A pipe leading to the burner of the gas flame, passes, air-proof, through the cover of this vessel, and is immersed in the liquid, thus shutting off the outward air from communication with the upper part.

"The latter is filled, above the above named liquid, with illuminating gas supplied from the gas works, and as the pipe which passes through the cover is of sufficient length to hold the hydrostatic column raised by the small and nearly constant pressure usual in gas pipes, it takes the place of the last stop cock in the supply pipe.

"By another pipe leading to the bell from a station at any required distance, the air in the upper part of the bell can be rarified, and thus the liquid in the hermetically closed vessel can be sucked up, lowering the surface so that the escape of the gas through the pipe leading to the burner is first opened, and then, on continued suction, the zinc and graphite plates are reached by the liquid.

"At this point the galvanic circle is closed, and the platinum wire over the mouth of the pipe leading to the burner becomes heated, and acquires sufficient catalytic power to kindle to a flame the hydrogen contained in the gas jet.

"After this is effected, a slight remission of the sucking power in the pipe is made to sink the level below the galvanic plates in order to avoid unnecessary exposure, but without shutting off the escape of the gas.

"In order to make sure of this effect on all the lamps a model apparatus must be placed at the station, corresponding in all respects to those of the lamps.

"The putting out of the light is effected by opening the sucking pipe to the access of atmospheric air, thus restoring the previous state of equilibrium, and, at the same time, preventing differences of temperature in different parts of the sucking pipes to cause partial suckings, and thus stop the correspondence in the working of the apparatus on the different lamps.

"This apparatus may be attached to any ordinary gas pipe, and is easily removed, when required, for the purpose of a revision.

"To guard against interruption in the hydraulic connection of the galvanic circle by the effect of low winter temperature, in either freezing the water of the filling or causing the bichromate of potassa to be crystallized from the solution, it is necessary to employ, during the winter months, a solution containing a greater quantity of sulphuric acid and less of the chromate, a mixture that practically is best prepared on cold winter days."

[The ingenuity of these devices is admirable, but we fear that their complexity and the necessity of *skilled attendance*, will debar their use in such cases as public gas lamps. Doubtless, however, there are isolated cases in which they may come into use.]

The British Patent Law.

SOUTHAMPTON BUILDINGS,
LONDON, July 6, 1871.

Editor AMERICAN GAS-LIGHT JOURNAL.

Dear Sir: I have the honor of submitting for your consideration, the accompanying Resolutions on the British Patent System, and I trust the interest felt by many of your readers in patent matters, will secure them a place in your Journal, with editorial remarks.

Yours truly,
GEORGE HASELTINE.

At a meeting of London Patent Agents, held on the 4th July, to consider the proposed changes in the patent laws, George Haseltine, M.A., in the chair, the following resolutions were adopted:

First—That the chief defects of the patent laws have arisen from a want of appreciation of the *natural* rights of inventors to the sole use of their inventions, an unreserved recognition of which rights must pervade every equitable patent system, and the true aim of patent legislation is to harmonise these individual rights with the material interests of the state.

Second—That the grant of patents to mere "*first importers*" is an injustice to inventors, an injury to society, as it induces the "pirating" of inventions, and the reason for these grants no longer existing, legislation should confine the issue of patents to actual inventors and their representatives.

Third—That in view of the benefits inventors confer on the public, and the expenses incident to the completion and introduction of new inventions, a patent for fourteen years is an inadequate compensation, and we deem it expedient to grant patents for a term of twenty-one years, without the privilege of extension.

Fourth—That the patent laws impose *penalties* upon inventors in the form of excessive fees, which justice and public policy demand should be reduced to the amount requisite to defray the expenses of an efficient administration of a simple patent system; and fees of ten pounds for the entire term—now one hundred and seventy-five pounds—would yield more than sufficient for the purpose.

Fifth—That the defects of the present practice should be remedied by the adoption of equitable "regulations," and the introduction of the system of granting patents at the risk of the applicants, without any official supervision of the specification or preliminary investigation of the merits of the invention.

Sixth—That the rights of patentees should be determined by a competent tribunal, excluding all technical objections to the validity of the patent, and we deem it expedient to dispense with jurors and "scientific experts" in patent suits.

Seventh—That these resolutions, signed by the Chairman, be forwarded to the Parliamentary "*Select Committee on Letters Patent*," and such other publicity be given them as he may deem conducive to the success of a liberal measure of patent legislation.

GEORGE HASELTINE, Chairman.

Zinc-Oxidation Power, in Electro Magnetic Engines.

Apropos of the item in our last, quoted from Prof. PHIN, we may further quote from the same pen, in *Technologist* for June:

"The following extract from a pamphlet, recently issued by Mr. Highton, gives a fair sample of the confusion that exists in that gentleman's mind in regard to force, at least in so far as the question of *quantity* is concerned:

"'What an enormous generation of force and disturbance of chemical and calorific equilibrium we can produce by the mere application to a forest of a lucifer match, or spark, which having once commenced the motion, constantly reproduces itself, till in a few hours the carbon and hydrogen have all become carbonic acid and water, and a grand disturbance of calorific equilibrium has been produced which takes ages to to restore itself, till at last, again, in due time, by the re-growth of vegetation, the carbon, hydrogen, oxygen, and caloric have recovered their original state; and all this grand revolution and restoration of forces—this regular round of chemical activity—has been produced by a lucifer match or spark! Nothing has been gained or lost; the heat produced by combustion has again been absorbed by the growth of vegetation; and the carbonic acid, and other compounds, have again been resolved into the shape of wood and leaves.

"'And cannot we, by skill, without force, induce more or less of the combined electricities, plus and minus, or of the combined heat and cold in matter, so to separate themselves that, by their re-combination, they may work for our benefit? This is the great physical problem of problems for science to solve. But, if this is a problem beyond our power to solve, the next best thing to be attempted is to harness in our service the great powers of nature, to catch and force to our own use the circuits of electricity when are forever circling the earth, and which hitherto we have only used to direct our magnets, and guide our ships; in fact to mount, as skilful and well taught Phaethons, the chariot of the sun, and force its four mighty steeds, strongest and mightiest of all steeds, heat, light, electricity, and chemical force, to work for us our ploughs, and looms, and engines, and drag our railway trains. Twice, indeed, every day as I sit and watch the Thames, I see the moon drawing up and down along its silent highway trains of barges; for does she not, as she goes round the earth, pull with her its tidal waters, with barges and all else that floats on them? I should like to see the sun put to the same kind of work, and as he rejoices like a strong man to run his race, to yoke him by the harness of induction, and conduction, and radiation, so as to force him to do for us more work, and to act more at our will and guidance, than we have hitherto forced or persuaded him to do.'"

"This is no doubt very pretty, plausible, and apparently philosophical; but, taken in connection with the position assumed by Mr. Highton, it is most arrant nonsense. The Bible long ago, in the words 'Behold how great a matter a little fire kindleth,' called the attention of the world to the point noted by Mr. Highton, but certainly never implied that the combustion of a small wooden splint was capable of evolving an unlimited amount of force. When, however, Mr. Highton has succeeded in boiling a single ordinary teakettle-full of water by means of the heat evolved by

a lucifer match, we will give him credit for the discovery that a certain amount of chemical change does *not* correspond with a certain amount of heat and electric force—but not till then!"

[In our last selection on this topic, we expressed the life-long hope of poor Mrs. Gradgrind, in "Hard Times," who died, however, without having "heard the last of it." We have now abandoned this hope; or rather we are imbued with new hope, by the announcement, in a recent English journal, vague at present, that Rev. Mr. HIGHTON is on a new tack, and will soon teach us a new thing, which while not in the nature of things *impossible* (like his former millenial visions) is certainly, if true, astounding; nothing less than a way of *substituting carbon for zinc* in voltaic batteries, which, theoretically, should give us electro-motive force at less than one-hundreth its present cost, and really inaugurate a new era of the world. *Nous verrons;* at least, we hope so.]

Gas Wells in Ohio.

In our issue of June 2, reference was made to the discovery of a gas well at Painsville, Ohio. In allusion to this the editor of the *Telegraph* of that place says:

At a depth of 550 feet a large vein was struck, of such force and power as to stop the work. Indeed there was no occasion for drilling deeper. The volume of gas is so great, it is estimated by good judges, that it would light the entire city of Cleveland. It comes up through the pipe from "the great deep" below with a rush and a roar and a grandeur which one must witness to appreciate. The farm of Mr. Jennings, on which this well is located, is on the east bank of the river, nearly opposite the Geauga furnace, on high ground, and about twelve miles from the lake shore.

The complete success of this experiment is destined to work an entire revolution in the gas business of Painsville. Citizens in different parts of the town are discussing the project of sinking wells to accommodate several families in the same neighborhood, in all of which cases it is intended to use gas for heating as well as lighting.

For this new "light" in the prosperity of our town and the comfort of our citizens, we are indebted to Gen. Casement. The General had faith that there was as much gas below as above the earth's surface, and the enterprise to bring it to light. All rejoice at his success.

Zinc in Drinking Water.

BY J. M. MERRICK, S. B.

Great anxiety has been manifested lately in Boston and vicinity in regard to the purity of water drawn through zinc-lined pipes, and numerous samples have been brought to me for examination. In most of these samples zinc, in the form of oxide, or of oxi-carbonate, was found in considerable quantity, and the natural inference, on the part of the consumers, was, that the water must be deleterious.

Several persons, on finding that there was "zinc in the water," incontinently pulled up their galvanized iron pipes, and substituted therefor block-tin, glass, gutta percha, etc., without stopping to learn whether the presence of a little zinc could be considered injurious to health.

I cannot think that the use of water containing small amounts of zinc-oxide or carbonate can produce any injurious results. I have never heard of a case where any disorder or abnormal symptoms could be traced to the absorption of zinc into the system from drinking water. Admitting for the sake of argument that zinc-oxide is poisonous, there are, I believe, no facts to show that it accumulates in the system like lead. Again, the oxide of zinc is a favorite tonic remedy (administered in cases of night-sweats, etc.) with some physicians, who occasionally give 10-grain doses three times per day, with, as they insist, beneficial results.

The harmlessness of zinc-paint, as compared with lead-paint, is well known.

Taylor on Poisons (London, 1859, p. 558), says: "Carbonate of zinc does not appear to have *any* poisonous action; and it would probably require to be given in large quantity to produce *any* effect." (The italics are my own.)

Further: Smee, in his *Elements of Electro-Metallurgy*, New York, 1852, p. xxix, says: "Those conducting electro-metallurgical operations generally fatten with their occupation, the minute quantities of *sulphate of zinc* and sulphuric acid which they imbibe, improving the tone of the stomach, helping digestion and strengthening the whole frame." (The italics, again, are mine.)

Popularly, zinc is classed with lead, as a poison, but it belongs in its physiological action, as a tonic, by the side of iron. So long as thirty grains per day of oxide of zinc can be taken with, to say the least, no injurious result, it is safe to assert that the small amounts daily introduced into the system from the zinc-lining of iron pipes, will not have any deleterious action upon the human system; and it is much more than doubtful whether they will have any recognizable action whatever. The soluble salts of zinc, of course, do not come under consideration here.—*Am. Chemist, June.*

Coal Statistics.

We think it is a fact beyond question that there are at present sent to market not less than 500,000 tons of coal per week. At this rate there would be 26,000,000 of tons shipped per year. As there have not been heretofore, and will not during the next twelve months, be consumed more than about 15,000,000 of tons—at most not more than 18,000,000—it does not require a very competent economist to see what the result must inevitably be. Either the present rate of production must be reduced or there must be months of idleness at some time within twelve months. At least every fifth ton of coal mined is in excess of the demand for actual consumption. This state of affairs may continue for some months, but it will finally end in a glutted market first, speedily followed by a still further reduction in the price of coal, and then a reduction in the miners' and laborers' wages, or suspension We premise that to the operators of coal mines it will be a matter of comparatively little moment when the market does become overstocked, for by a combination they can simply retain their stocks for a few months, when the retailers will be run short and the price go up. The large corporations need not sell their coal for months, though they have millions of tons on hand. The past history of the coal trade bears evidence of the truth of this assertion. Perhaps not in ten years was the market so thoroughly exhausted as it was at the close of the last suspension, and yet coal is selling almost as low to-day—after only a few weeks of work—as it did in November. To illustrate: In November, at the auction sales in New York, some of the coal sold for $4.56 per ton, and at the last sales 120,000 tons were disposed of at an average of $4.72. It is more than likely that at the July sales it will be fully as low as in November, and, if the present immense shipments continue, it may go even below those figures.

It is evident that at some time, sooner or later, the production must be reduced very greatly. But instead of the number of coal works being diminished, they are multiplying rapidly in the entire coal fields of Pennsylvania, bituminous as well as anthracite. All over-production cannot for any great length of time be borne either by operators or miners. The people, of course, demand cheap fuel; but they cannot get it and the miners receive large wages and the operators make large fortunes at the same time. Unless the miners receive good wages they will not work; and when the operators cease to make fortunes out of their large capital invested, they will turn it into other and more profitable channels. The only way in which it is possible to keep the prices of coal at a standard that will give the miners good wages, and the operators a satisfactory return on their invested capital, is to approximate the production of coal more nearly with the consumption.—*Scranton Republican.*

ANTHRACITE COAL.—The anthracite coal trade continues very active, and prices of coal are barely maintained; indeed, the public sale of Scranton coal at New York last week showed an average decline of about thirty cents per ton on cargo prices. Notwithstanding this fact and the steadily increasing supply of coal, some of the papers claiming to speak for the trade, reiterate their declaration of a fortnight ago that "coal is selling at its lowest point for this year. As present prices scarcely confirm past predictions, those made now of a like nature it can hardly be hoped will command any very great confidence. Coal ought to be furnished to Philadelphia consumers within the range of $9 to $7 per ton, and if the production was entirely unobstructed, it no doubt could be. The facilities for moving coal to this city, and, indeed, to all the great markets, are extraordinarily large. The capacity of the Reading Railroad in the movement of coal is almost incredible, as is shown by its weekly tonnage reports.—*Railroad and Min'g Jour., July* 8.

The Use of Oxygen in Oil Wells.

James Dickey has invented an alleged new and useful improvement in removing paraffine deposits from oil wells and the crevices of oil rocks. It consists in burning out the paraffine by means of oxygen, or other combustible gas introduced through the well or otherwise, in pipes or by other means, and ignited in the presence of the paraffine, the gas being introduced by pumps.

The crevices in the oil bearing sand-rock become clogged from time to time by the paraffine deposited by the oil which adheres to the walls, also by the seed and other packing used around the well-tube, gradually choking them up. This is the main cause of the cessation of the production of oil in the wells, and it is on this account that torpedoes are now used for breaking up the rock and blowing off the paraffine deposits.

Dickey has found by practical experiment that these paraffine and other combustible deposits may be rapidly and effectually consumed by oxygen.

He introduces the gas to the top of the well and fires it; when the well is cased it immediately ignites the deposit in the interior of the well-casing, and burns downward, consuming it as the fire descends, and the burning ceases when the paraffine is all consumed. Or, when the well is not cased, he introduces the gas through the gas-escape pipes of the well, below the seed-bags or other packings placed around the pump-tube, to prevent the surface water from filling the well, and ignites it in the pipe at the top of the well, when it mixes with the escaping gas; or, it may be conducted to the bottom in cased wells, if preferred, as may be required. From the bottom of the well the fire follows the crevices in the sand-rock, through which the oil flows to the well, penetrating to great distances, and continues to burn as long as the oxygen gas is supplied, or while it encounters the paraffine deposits. The fires in the well and crevices are under control by regulating and controlling the supply of oxygen, thereby all danger from the burning of the gas arising in the well is avoided.

This method of removing the paraffine deposits is cheaper and more effective than the method of blasting and breaking up rock, as is now done by torpedoes, which has been found in many instances to fail in removing the deposits, but also to materially injure the wells by wholly closing up the crevices, whereas this improved manner of operation cannot injure the well in any way. He also proposes to effect the removal of said deposits or their detachment from the walls of the wells and the crevices, by explosions of the oxygen gas and the gas of the wells when combined therein in sufficient quantities, the explosions being caused by electricity as being the most convenient. He also produces the necessary combustion for burning the paraffine gas, and causes these explosions, by a combination of the oxygen of the air with the gas arising in the well, the air being forced in by means of pumps or blowing machines, and in some cases he proposes to use the oxygen from the air instead of the oxygen gas prepared as above described; but he generally prefers the latter.—*Jour. Applied Chemistry.*

Density of the Earth's Interior.

Physicists assume that the density of the globe increases towards the centre in arithmetical progression; but this assumption is not sustained by sound reasoning. At a distance of only 1-20 of the earth's radius=1,044,400 feet from the surface, the weight of a superincumbent mass of fused granite will exceed 900,000 lbs. to the square inch, equal 60,000 atmospheres. Under this pressure the weight of air will be 70 times that of water, and 3.5 times that of the heaviest metals. Gold, at the point of fusion, is seven times heavier than fused granite, while neither of these solids loses more than 3-100 of specific gravity at melting heat; a fact which proves conclusively that high temperature of metals and minerals is not incompatible with great density. Hence, fused granite, in the earth's interior, may be many times heavier than the cold mineral at the surface. Unless, therefore, we are prepared to dispute the assumption that fused granite under a pressure of 900,000 lbs. to the square inch will have its specific gravity doubled—involving a density less than one-third of fused gold not subjected to compression—we must admit that the specific gravity of the earth at the depth of 1-20 of the radius, is so great that, if the density, as physicists have assumed, increases in arithmetical progression towards the centre, our planet would be many times heavier than it is. We are compelled, therefore, to reject the accepted theory.—Capt. Ericcson in *Van Nostrand* for July.

On the Preparation of Anthracene.

This hydrocarbon, which has attained a great importance as material for the artificial preparation of of the madder-colors, is found in the last products of the distillation of coal tar, which, under the name of "green-grease," are sometimes sold as axle-grease. They consist of a heavy oil, some naphthaline, and about twenty per cent. of anthracene. In the whole, the amount of anthracene in coal tar is only from ¾ to 1 per cent.

In order to separate the oily products from the solid hydrocarbons, this soft mass is introduced into a centrifugal machine; the residue left is heated to about 110° *F.* and subjected to the action of a hydraulic press. If the crude material is thin, it is best to employ at once a filter-press. The resulting mass, which contains about sixty per cent. of anthracene, is exhausted with benzole or gasoline, again subjected to the centrifugal machine, in order to separate the last portions from the light oils. There remains a greenish-white, paraffine-like mass of a beautiful crystalline fracture, containing ninety-five per cent. of anthracene, from which, by sublimation, a perfectly pure product having a melting point of 420° *F.* can be obtained. Wartha in the "*Mittheilungen der deutschen chemischen Gesellschaft*" states that the anthracene may be very conveniently obtained pure, if by means of a blower a strong current of air is directed into the retort, while the anthracene is at the boiling point.

The writer of this would remark that years ago, in conjunction with Orazio Lugo, of Baltimore he purified naphthaline in exactly the same manner.

The anthracene thus evaporates in a surprisingly short time, and may be collected in a large tubulated glass balloon, where it is deposited as a pale, yellowish, snow-like mass. It is important that the distillation of the tar be carried only to the point when products of pitch-like consistency begin to pass over. If the distillation be allowed to go further, hydrocarbons with a higher boiling point will distill, and these can only with difficulty be separated from the anthracene, thus making it unfit for the preparation of colors. This is especially true of the chrysene, which differs from the anthracene by its lesser solubility in sulphide of carbon.—*Prof. Phin, in the Technologist.*

Explosion of Gas Stoves.—Since the publication of our last number, says the *Journal of Applied Chemistry*, we have heard of numerous instances of explosions of stoves in which the light oils of petroleum were employed as the source of heat. Several persons have been burned to death, and a large amount of property has been destroyed by fire. Notwithstanding these fatal accidents the sale of the dangerous oil goes on, and the patent lamps and stoves are sent all over the country. We must again utter a note of warning, and remind our readers that it would be quite as wise to try to burn gunpowder in a stove, as it is to use naphtha for heating purposes. By means of a very ingenious apparatus, and the practice of great skill, Bunsen burned gunpowder and analyzed it; that is no reason why everybody else should repeat the experiment. It is equally possible to burn naphtha and explosive oils in lamps and stoves, but as the precautions to be observed are numerous and difficult of execution, no one but the best trained chemist ought to venture to use these liquids for heat or light. The sale of such articles to the public ought to be prohibited by the most stringent laws.

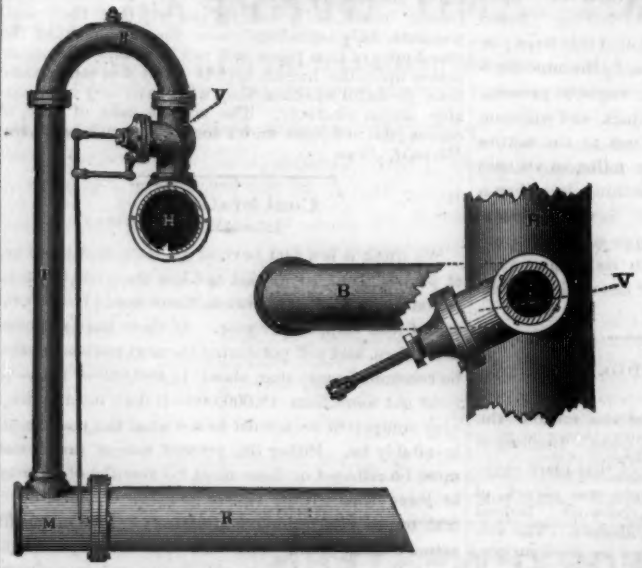
A Lecture Experiment to Illustrate Diffusion.—F. Woehler.—Instead of closing the end of the diffusion-tube by plaster, a galvanic cell is connected with it; this apparatus, when filled with hydrogen, is immersed with its lower orifice into a pneumatic trough, when the fluid will almost immediately rise up to the cell, even if the tube be over one meter long. If it be placed in a trough filled with colored water and a bell-glass filled with hydrogen held over the cell, the hydrogen will diffuse into the tube, and a vigorous evolution of gas is observed from the end of the tube in the trough. After a few moments, equilibrium is established; the bell-glass is now removed. and instantly a blue column rises in the tube, the mixture of air and hydrogen diffusing from the tube into the air. —*Am. Chemist.*

[It is now at least seventeen years since we saw our departed and lamented friend, Dr, Wm. H. Ellet, use the porous cells precisely in this way and for the same purpose. The writer has himself used it in lecture illustrations twelve years since. If the bell filled with hydrogen be raised and lowered alternately over the porous cell, the column of liquid in the tube promptly rises and falls accordingly, forming a most striking experiment.—Ed.]

The American Coal Gas-Light Improvement Co.

ARE THE SOLE OWNERS OF THE

GIBSON IMPROVEMENT



In the manufacture of Coal Gas by means of which Dip-Pipes are dispensed with, the deposit of Carbon in the Retorts prevented, and a very large saving is effected.

Licenses for its use will be granted; also the parts necessary will be supplied to order, on application at their office,

No. 79 Water street, Boston, or

No. 41 Pine street, Room 1 . New York.

R Retort.

M Mouth-piece.

P Stand-pipe.

B Bridge-pipe.

H Hydraulic main.

V Valve-substitute for Dip-pipe.

PRICES OF FOREIGN AND DOMESTIC GAS COALS.

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116,576.—Water Meter.—G. D. Emerson, Calumet, Mich.

16,611.—Water Gage.—M. N. Lynn, New Albany, Ind.

1116,660.—Gas Lighting.—A. N. Allen, R. H. Dewey, Pittsfield, Mass.

116,749.—Water Wheel.—E. Poole, Gouverneur, N. Y.

116,937.—Water Wheel.—D. Ehrhart, Bell Air, Md.

116,949.—Wter Pipe.—J. R. Griffin, Waterdown, Conn.

116,994.—Hydrocarbon Gas.—F. A. Sabbaton, Troy, N. Y.

117,035.—Water Meter.—J. S. Barden, Providence, R. I.

117,193.—Water Wheel.—C. M. Mooney, Scotch Plains, New Jersey.

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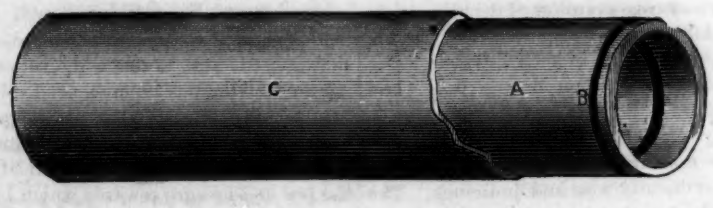

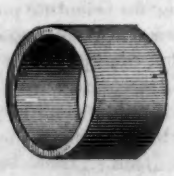

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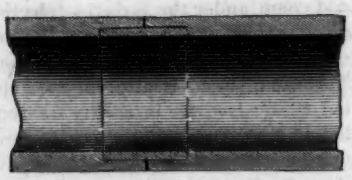

FIG. 3.

A—Cylinder of Wood. B—Band of Iron. C—Coating of Hydraulic or Asphaltum Cement.

FIG. 2.—Thimble for Connection. FIG. 3—Horizontal Section and Connection.

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WEDNESDAY, AUGUST 2, 1871.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

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General Editorials.

THE BRITISH PATENT LAWS.

In another column will be found some resolutions adopted at a meeting of patent solicitors, in London, which came to us with request that we publish them, which we do in consideration of the fact that there are no doubt some of our readers interested in British patents. These resolutions, by the way, are absurdly reported in one of our daily papers, as involving "a movement to make the English laws like those of the United States"; this in spite of the fact that they advocate the total abandonment of what constitutes the very corner stone of our law, that is, the determination by the Patent Office of novelty or originality of invention.

There is just now so much agitation in England on this subject of their clumsy, unjust, and oppressive system of administration of patent law, that there can be little doubt something will come of it in time in the way of reform. It will have been observed that the President of the British Association of Gas Managers, in his Inaugural printed in our last issue, refers to this subject, though he takes the ground—a ground in which we ourselves concur—that there should be a more complete preliminary investigation before a patent is granted, instead of a total abolition of such investigation. Instead of throwing on inventors, generally poor and frequently unlearned men, the burden of the labor and risk of searching out and ascertaining the kind and degree of novelty in their devices, of making themselves acquainted, in other terms, with the whole history and literature of the art, our law benevolently provides (*in theory*) that certain government officials, supposed to be selected from the most learned and skillful members of the whole community, shall be appointed, on whom shall fall the labor and responsibility of deciding these questions. All that is really required for the perfect practical working of such a system is the strict and faithful execution of the letter and spirit of our law.

We look upon some of the other reforms suggested in the resolutions of the London patent attorneys as eminently wise and judicious. The theory started with, that a true inventor is a cosmopolitan benefactor, and that a successful invention is a boon conferred on mankind *in general*, which in reality should come under the jurisdiction of the general law of nations, is the only just view. It follows of course from these premises that "patents of importation," monstrosities unknown to the United States law, are in reality *piracies*; an impeachment that American writers have often brought against them, but which, if we are not wrong, is here for the first time openly confessed by a convocation of British gentlemen. (We may here say, however, that the chairman of this meeting, Mr. HASELTINE, is, as he informed us personally during his last visit to this country, an American by birth).

An increase of the period, and a very great diminution of the pecuniary tax upon inventors, are also reforms too notoriously called for to leave room for doubt or dispute in any equitable and unprejudiced mind.

Besides our disagreement, above set forth, with these resolutions, where they urge that no examination should be made of inventions before issue of patents, there is another point, advocated in the sixth resolution, from which, if we take its sense correctly, we must emphatically dissent, and in which we do not believe they will succeed in obtaining the concurrence of the public or of legislators. This is where they propose to abolish the practice of using the testimony of Scientific Experts upon controverted scientific points. We do not believe, however strongly these gentlemen may feel convinced of it, from their point of view, that the public can be brought to believe it detrimental to the interests of justice to receive the testimony, on special subjects, of those who have spent their days in special study of such subjects.

It is certainly a subject for congratulation nevertheless that the spell which has so long wrapped around this British "Circumlocution Office" seems almost certain to be at last broken through by the light of the civilization of the Nineteenth Century, and that the art of "how not to do it" is likely to become a barbarism of the past, so far as British patents are concerned.

THE AMERICAN CHEMIST.

It is now some months since this valuable Journal passed altogether (by purchase we believe) into the hands of its Editors Prof. C. F. CHANDLER and his brother W. P. CHANDLER. A notice of the circumstance has been crowded out of our columns up to this time. It seems to us that we may possibly be at the opening of a new epoch of chemical science in America. An interest in original investigation in this direction appears, in some cases at least, to be awakening. This is a sentiment which had in great measure died out in our country, during the last two decades, and it is not easy to point out many important achievements of American chemists during this period. This has been due, not to lack of ability or inclination, but chiefly to lack of encouragement and appreciation. The number of those who are born with the qualities that fit them to sustain the scientific status of a people, by dint of original discovery, and more especially in the stupendous and intricate science of Chemistry, must always be small, and still smaller among these the number whose lines are so cast that they are able to attain the voluminous reading and the tedious practice needed by a successful chemical investigator of the present day. Instead of seeking out such, however, the American public has been far more ready to bestow the few and meagre rewards which belong justly to this class, upon another class whose practice is to make Science a secondary consideration, devoting themselves chiefly to the business of electioneering for scientific positions. Popularity, newspaper-notoriety, nepotism, ecclesiastica patronage, and even practices which verge much too close on flat charlatanism, are influences far more potent in this country in controlling the rewards due to scientific achievement, than such achievement itself. These be bitter words, and would surprise many college trustees, who, however, will never see them. They are words, nevertheless, whose truth will scarce be denied by any one who is both correctly informed and disinterested.

In this state of things, which we do not hope to mend, as we possess neither the enthusiasm nor the inexperience that are needed by a "world betterer," it is not surprising that chemical discoveries, made in America, should of late years have been almost like angels visits, and that disappointment, or the *res angusta domi*, or other inducements, should have driven or drawn numbers who were born to be chemists into other walks of life, to become thereafter "mute inglorious Miltons." Still there is, according to our faith, a "divine afflatus" pertaining to Science, as to Art, which will rise and assert itself, in spite of every discouragement; and we have just

now, as we said before, good hope of a revival of original chemical investigation in America. If we are correct in this, the enterprise so boldly entered upon by the brothers CHANDLER will be of the greatest benefit, representing, as it does, the only (we believe the first) purely chemical American scientific journal, and presenting an appropriate medium for conveying to the scientific world the new discoveries which (*we hope*) are going to be made. The merit of these gentlemen among American Scientists may be placed at a high mark. Like as a railway through an unsettled and uncultivated wilderness, by faciliating travel and traffic, actually creates them, and feeds its own prosperity; so a scientific journal, devoted to a specialty, has always been found, by virtue of the same law, to instigate and foster progress in that specialty.

THE AM. ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The Local Committee at Indianapolis, the place selected for this year's meeting of the Association, have issued the usual circular, in advance of the session, which commences on Wednesday, the 16th inst., at 10 A. M., under the Presidency of Professor ASA GRAY of Cambridge. From the circular we learn that rooms have been assigned for the meetings and committees in the State Capitol, the Senate Chamber and the House of Representatives being occupied by the two principal sections of the Association respectively. Prof. STERRY HUNT, the retiring President of the Association, will deliver an address on the afternoon of the first day, on the occasion of a public reception of the Association by the Governor of the State at the Academy of Music. Several interesting excursions, and so forth, have been arranged for. We fear that the distance of the point of meeting this year will deter numbers of eastern members, as in our own case, from the undertaking. Doubtless, nevertheless, as in the case of the Chicago meeting in 1868, this deficiency will be fully made up by the numerous western members; a large and stirring scientific reunion may with confidence be predicted.

THE IMPROVEMENTS OF MESSRS. GIBSON AND JONES.

We direct attention to a communication (illustrated by cuts) in other columns of this issue, on the subject of these improvements, in which various adverse arguments that have been suggested by some gas experts against these plans, seem fairly and fully met, so far as they can be by words; the case being one in which deeds, in addition to words will of course be required. We are therefore pleased to announce that we have received advices to the effect that arrangrments are now nearly completed, at a gas works in this vicinity, for a full series of experiments on the practical working of the Gibson and Jones improvements, which we trust will furnish us the opportunity to lay before our readers at a very early day, the results of our own observation.

SMEDBERG'S SYNOPSIS.

Mr. Smedberg writes us that his invaluable "Synopsis", is ready for the press. He requires fifty more subscribers to pay the actual cost of publication, which can hardly fail to come in, in answer to this last appeal of his. No more caustic comment upon the indifference of our gas companies to their truest interest can be imagined, than the fact that this great work of one of our most able engineers has been so poorly encouraged. It is not yet too late to wipe out this stain. If any company desires the book, now is the last chance of securing it.

Manufacturers will appreciate the benefit of advertising in the pages of this standard work, and should forward their applications at once to Mr. Smedberg's San Francisco address.

Errata.

Our attention has been called by the author of "Valuable Improvement in Gas-Making," which appeared in our issue of July 17th. On page 18, 24th line from top of first column, the word "thin" occurs, which should be *their*.

OFFICE OF

THE GAS-LIGHT CO. OF AMERICA.

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LEONARD D. GALE, Consulting Chemist.

GENTLEMEN: We beg leave to inform you, that we have purchased the Patent process for making ILLUMINATING GAS from PETROLEUM and its products, known as the

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We are also prepared to contract for putting said process into successful operation in your works, furnishing all the necessary plans, materials, and workmen for that purpose.

We do not deem it necessary to enter upon a detailed description, here, of the processes above referred to, deeming it sufficient to state, to secure your interest and investigation, that they have been in successful operation, for months, in a number of Gas-Light Works in the United States, and are now being introduced in the works of the Mutual Gas-Light Company, of New York City; the Citizens' Gas-Light Company, of Brooklyn; the New Orleans, San Francisco, and very many other Gas-Light Companies throughout the country.

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[Prof. W. makes a specialty of GAS CHEMISTRY, and the Analysis of Gas and Coals. Formerly Chemical Examiner in the U. S. Patent Office Practices as

Counsel, and Adviser

of INVENTORS, in all the CHEMICAL ARTS; for which his great general experience in these Arts, and his special experience inside the Patent Office, have qualified him to an unparalleled degree.

Prof. WURTZ is Editor of the AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY, a journal whose circulation and patronage is among classes of the community of the highest position, influence and enterprise; and which furnishes therefore an unequalled medium for communication to the general public of valuable inventions and novel enterprises.

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Respectfully Yours,
H. A. ALLYN,
Superintendent Brookline Gas-Light Co.

EAST BOSTON, June 15, 1871.

Gentlemen: We have used your Screens some five years They give perfect satisfaction.

I consider them *by far the best Screen* for Dry Lime Purifiers I have seen.

Yours truly,
A. M. NORTON,
Supt. East Boston Gas-Light Co.

CHELSEA, May 1, 1871.

MR. E. DUFFEE:

We are using your Purifying Trays, and find them to be the *best of any* that I have used, and will *purify more gas with less pressure* than any tray that I know. I can fully recommend them, after four years trial, to any Gas Superintendent with perfect safety, as the *cheapest and best Tray made.*

Yours truly,
JOHN ANDREW, Supt.

JAMAICA PLAINS, MASS., June 21, 1871.

EDWARD DUFFEE, ESQ:

Dear Sir: The Trays ordered by this Company three years ago, are getting somewhat worn. I wish to say here that I consider your Trays to be superior to any yet invented, therefore please make us another set at the price named, to be like the sample shown in every way, and oblige. Yours truly,
JAMES F. ROGERS,
Supt. Jamaica Plains Gas-Light Co.

Also see letter from Providence, R. I., in another column.

It will be for the interest of all Gas-Light Companies needing new Trays another season, to give their orders early, to be delivered where wanted, as we were unable to fill orders promptly to Companies ordering late last fall.

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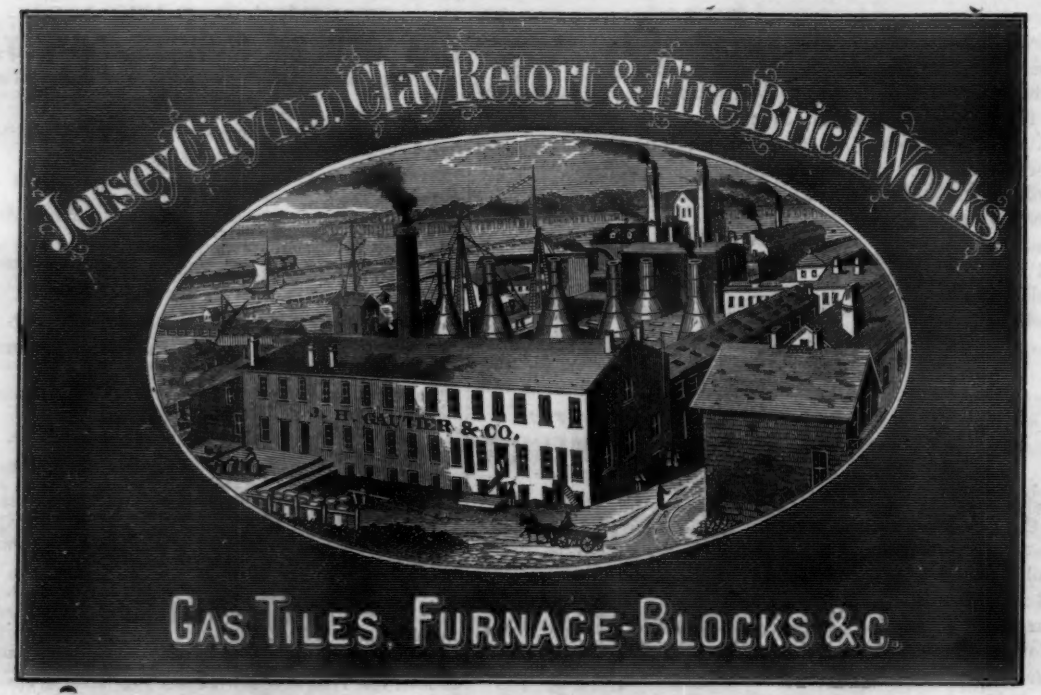

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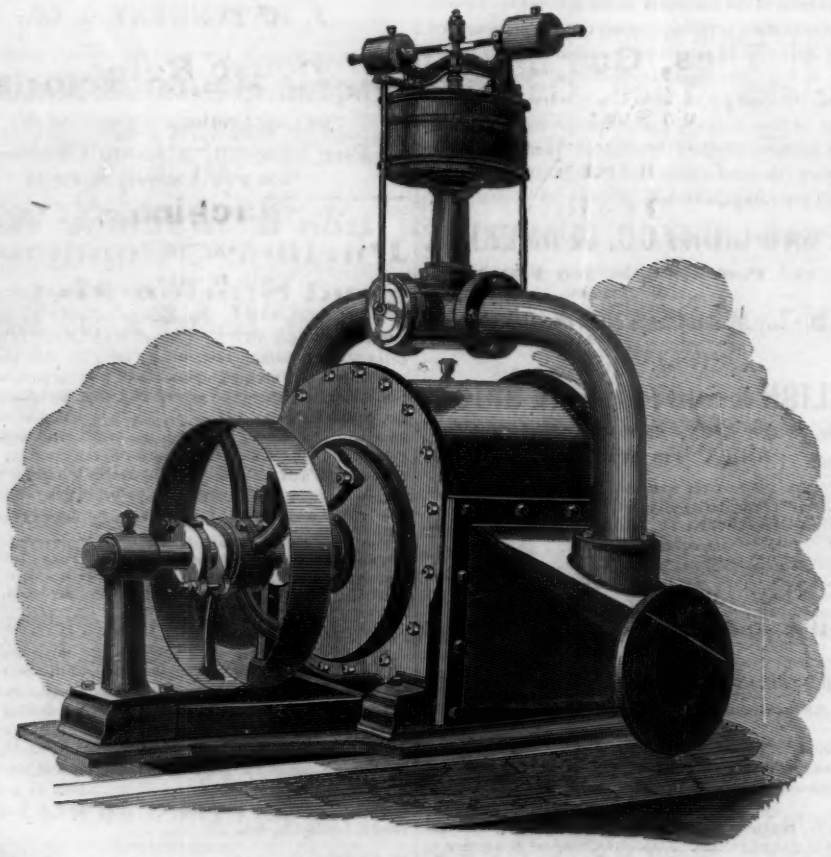

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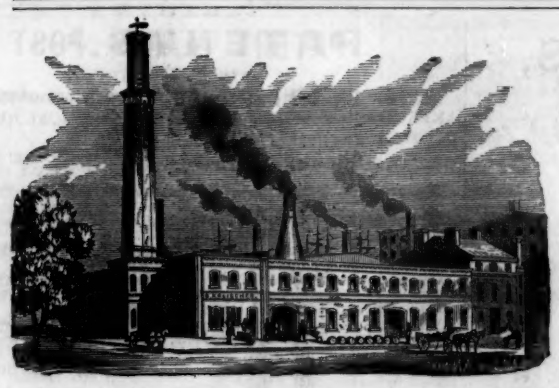

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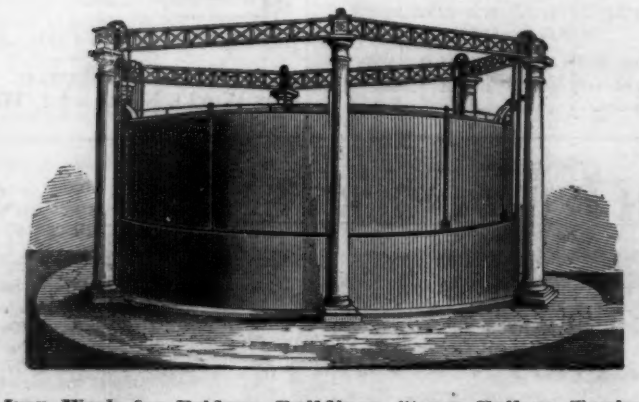

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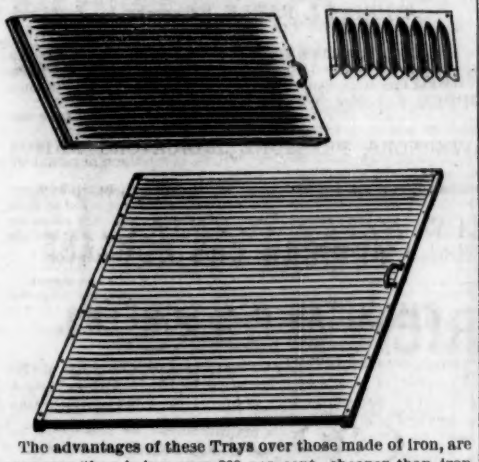

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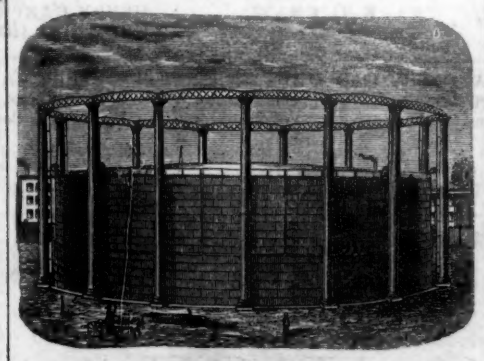

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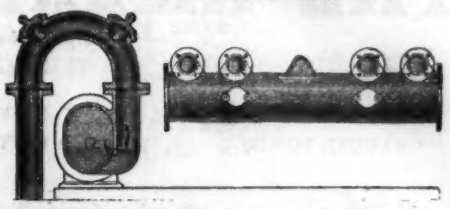

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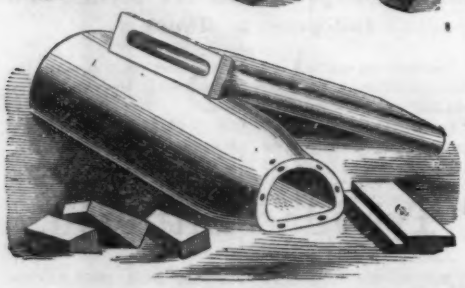

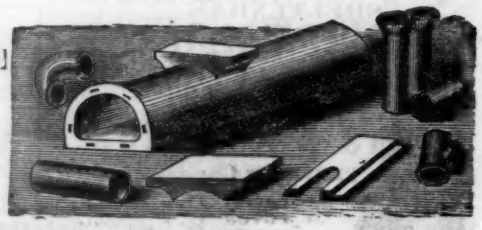

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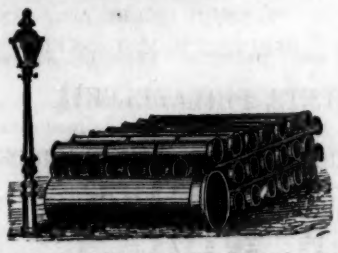

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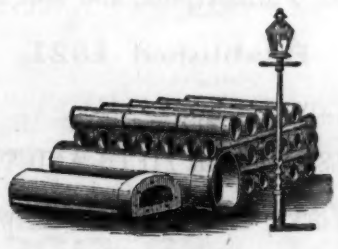

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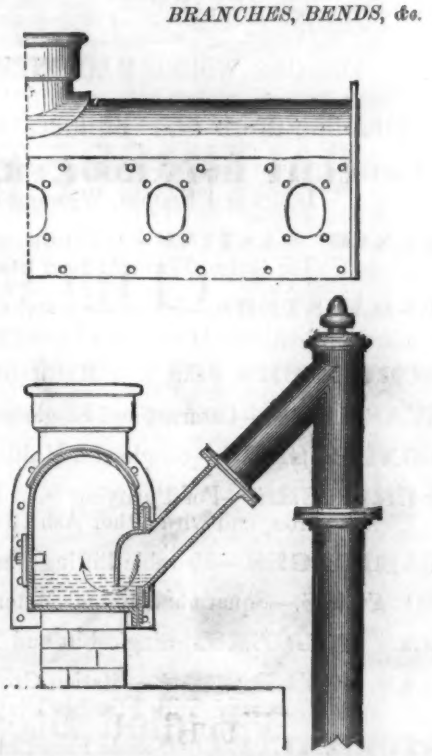

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